

Chapter 12-7-2
FIRE-RESISTIVE STANDARDS
FIRE DAMPERS STANDARD 12-7-2

STATE FIRE MARSHAL Scope Sec. 12-7-200.

(a) These requirements and methods of test apply to fire damper assemblies of various materials and types of construction.

NOTE: Fire and panic safety standards requires the installation of fire dampers in ducts passing through area separation walls, occupancy separation walls, vertical shaft walls, corridor walls in which openings are required to be fire protected, horizontal exit walls, fire-rated assemblies except those required by reason of the type of construction and air outlet openings in fire-rated ceiling-floor or ceiling-roof assemblies not otherwise qualified by standard full-scale fire tests.

(b) Tests made in conformity with these test methods will register performance during the fire test exposure, but such tests shall not be construed as determining suitability for use after exposure to fire.

Instructions Sec. 12-7-201.

(a) Approved installation instructions shall be provided by the manufacturer. Instructions shall be illustrated and shall include directions and information adequate for attaining proper and safe installation of the product. Instructions for mounting and for joining with duct material shall be included.

(b) The instructions shall require the use of sleeves with perimeter mounting angles attached to the sleeves on both sides of the wall opening. The connecting ducts shall not be shown as continuous, but shall be shown to terminate at the sleeve. The duct connection to the sleeve shall be provided with S-type slip joints.

Sleeve gages shall conform to the gages fire tested. Sleeves shall not extend beyond the wall opening a distance greater than the area required for the attachment of the retaining angle and S-type slip connection.

EXCEPTION: The installation instructions for fire dampers tested and listed with integral frame and sleeve of sufficient width to permit direct attachment of perimeter mounting angles on each side of the wall opening are not required to indicate the use of sleeves, provided the gage of the damper frame conforms to the requirements for sleeves.

(c) Dampers shall be provided by the manufacturer as fire tested except for mounting angles which may be field applied.

Construction Sec. 12-7-202.

(a) Fire dampers shall be constructed so as to provide an effective barrier to air flow when in the closed position. In fire dampers intended for installation in ducts, the vertical through openings at the sides of the blades for operating clearance shall not exceed 1/4 inch, horizontal through openings for operating clearance shall not exceed 1/32 inch. Fire dampers intended for installation in partitions or walls outside of ducts shall have no vertical or horizontal through openings.

NOTE: A through opening in a damper is a visible opening in the face of the damper when viewed on a plane perpendicular to the mounting plane. (b) Nonmetallic or organic materials used as binders, adhesives, insulation sealants, or finishes may be used if the product otherwise conforms to these requirements.

- (c) Component springs and bearings used in the assembly of a fire damper shall be of material having resistance to atmospheric corrosion equivalent to brass or bronze.
- (d) Component springs used in the assembly of a fire damper shall be of material having spring properties equivalent to stainless steel conforming to ASTM A 313-67.
- (e) Steel parts used in the assembly shall be provided with corrosion protection equivalent to one of the following corrosion protection systems:
1. Employing stainless steel having resistance to corrosion at least equal to one of the 300 series of stainless steels.
 2. Coating of zinc capable of withstanding not less than two dips in a standard copper sulphate solution.
 3. Coating of cadmium not less than 0.00050 inch thick.
 4. Two coats of good quality finish of the alkyd-resin type or other type outdoor paint. The suitability of the paint may be determined by consideration of its composition or by corrosion tests.
- (f) Coated or uncoated metals used in the assembly of fire dampers shall not be used in combination such as to cause detrimental galvanic action which will adversely affect the function of any part of the assembly formed from such material.
- (g) A fusible link, other temperature responsive device, smoke or particles of combustion responsive device shall be of an approved type and shall be capable of carrying the imposed load.

Performance Sec. 12-7-203.

(a) The performance of fire dampers shall meet the applicable requirements when tested as described herein. If any indications are observed during the tests that the product will not continue to meet the requirements in normal usage so as to ensure continued safe performance, such supplementary tests shall be conducted as deemed necessary to ensure safe service. Table 12-7-2A indicates the tests applicable to the specific types of fire dampers.

Closing Reliability Test Sec. 12-7-204.

- (a) A damper assembly shall close and latch automatically (if latch is provided) from the open position, during each of the 250 operations, and shall throughout this test show no evidence of undue wear, distortion, displacement or rupture of its parts.
- (b) Samples representative of the largest and smallest size, style and arrangement of damper assembly shall be subjected to the closing reliability test. Damper assemblies intended for horizontal installation shall be tested in a horizontal plane and not depend on installation in an inclined position for proper operation.

Dust Loading Test Sec. 12-7-205.

- (a) A damper assembly shall close and latch automatically (if latch is provided) from the open position following exposure for 7 hours to an air-blown circulating grain-dust air mixture. The grain-dust shall pass through a 100-mesh screen.
- (b) Samples representative of each style, and arrangement of damper assembly supported in the position of its intended use shall be tested in a specially constructed test chamber, approximately 5 by 7 1/2 by 5 feet high, provided with observation windows and with auxiliary equipment to produce a circulating grain dust-air mixture. Nozzles shall be provided to direct the dust-air mixture toward the sample, and the dust particles shall be allowed to accumulate on the various parts of the damper assembly.

Salt-Spray Exposure Test Sec. 12-7-206.

(a) A damper assembly shall close and latch automatically (if a latch is provided) following exposure for a period of five days to salt-spray when tested as described in subsections (b), (c), (d), (e) and (f).

(b) A representative sample of each style and arrangement of damper assembly shall be used for the salt-spray exposure test.

Prior to test all grease or oil shall be removed from the test sample, using organic solvents.

(c) The test sample shall be installed in the test chamber with the damper open and supported in the position of its intended use and exposed to the salt spray for a period of five days (120 hours). The temperature of the sample and the test chamber shall be maintained at 95°F (35°C) plus 2°F (1°C) or minus 3°F (2°C) throughout the test period.

(d) The apparatus to be used for salt spray (fog) testing shall consist of a fog chamber having a salt solution reservoir, a supply of suitably conditioned compressed air, a dispersion tower for producing a salt fog, specimen supports, provision for heating the chamber and necessary means of control. The dispersion tower shall be located in the center of the chamber and shall be supplied with salt solution and with warmed, humidified air at a pressure of 17 to 19 pounds per square inch so as to disperse the salt solution in the form of a fine mist or fog throughout the interior of the chamber.

(e) The salt solution shall consist of 20 percent by weight of common salt (sodium chloride) and distilled water. The pH value of this solution as collected after spraying in the test apparatus shall be between 6.5 and 7.2 and the specific gravity between 1.126 and 1.157 at 95°F (35°C).

(f) At the conclusion of the salt-spray exposure, the test sample shall be removed from the chamber and allowed to dry for 24 hours at room temperature. It shall then be placed in its normal mounting position and on release shall close and latch automatically (if latch is provided).

Spring Closing Force Test Sec. 12-7-207.

(a) A spring-operated damper assembly shall employ a spring or springs capable of exerting a force of 2 1/2 times that required to close and automatically latch (if a latch is provided) the damper.

(b) A sample representative of each size, style and arrangement of damper assembly shall be subjected to this test. All springs shall be disconnected and the damper assembly placed in the intended operating position.

(c) The force required to close and latch the damper shall be measured by appropriate means at each of a series of positions assumed by the damper from wide open to closed (latched). Force as measured shall be applied through, and at the point of connection of the spring or springs, to the damper blade or operating arm.

(d) Three samples of each spring employed for closing and latching shall be tested for force exerted over the range of extension or compression required for the motion involved in the assembly. The force available from the action of the spring or springs shall be 2 1/2 times that required for the closing and latching of the damper at any position of travel from wide open to latched.

Zinc Coatings Sec. 12-7-208.

(a) A protective coating of zinc shall be such that a sample of finished galvanized steel parts will not show a fixed deposit of copper after two 1-minute immersions in a standard copper sulphate solution, as described below.

(b) The apparatus consists of a large glass beaker; a chemical, all-glass, mercury thermometer; a watch or clock with a second hand; a standard solution of copper sulphate; a number of clean, dry cheesecloths; and a solvent (carbon tetrachloride or chloroform). It is essential that running tap water be available.

(c) The standard solution of copper sulphate which is to be used in this test is to be made up from distilled water and crystals of chemically pure copper sulphate. In a copper bottle or other suitable container made of copper, a sufficient number of the crystals is to be dissolved in hot distilled water to obtain a solution which has a specific gravity slightly higher than 1.186 after the solution has been cooled to a temperature of $18.3 \pm 0.1^\circ\text{C}$ ($65.0 \pm 0.2^\circ\text{F}$). Any free acid which may be present in the solution is to be neutralized by the addition of approximately 1 gram of cupric oxide (CuO) or 1 gram of cupric hydroxide [$\text{Cu}(\text{OH})_2$] per liter of solution. The solution is then to be diluted with distilled water to obtain a specific gravity of exactly 1.186 at a temperature of $18.3 \pm 0.1^\circ\text{C}$ ($65.0 \pm 0.2^\circ\text{F}$). The solution is then to be filtered.

(d) Several 6-inch-long specimens are to be cut and any grease, paraffin, or the like is to be removed by washing the specimens in carbon tetrachloride or chloroform. Each specimen is then to be examined for evidence of damage to the zinc coating, and one which is not damaged is to be selected for use in the test.

(e) The selected specimen is to be rinsed in water and dried with a piece of clean cheesecloth. The surface of the zinc must be perfectly clean before the specimen is immersed in the solution of copper sulphate. Due care must be taken to avoid any contact between the hands or any foreign material and the cleaned surface.

(f) A glass beaker having a diameter equal to at least twice the width of the specimen is to be filled with the standard solution of copper sulphate. The temperature of the solution is to be maintained at $18.3 \pm 1.1^\circ\text{C}$ ($65.0 \pm 2.0^\circ\text{F}$). The specimen is to be immersed in the solution and supported on end in the center of the beaker so that not less than $2\frac{1}{2}$ inches of its length are immersed.

The specimen is to remain in the solution for 60 seconds, during which time it is not to be moved or the solution stirred.

(g) At the end of the 60-second period, the specimen is to be removed from the beaker, rinsed immediately in running tap water, rubbed with clean cheesecloth until any loosely adhering deposits of copper are removed, and is then to be dried with a piece of clean cheesecloth. Again, care is to be taken to avoid contact of the test surface with any foreign objects or the hands. If any part of the surface which was immersed has a bright deposit of firmly adhering metallic copper, an estimate is to be made quickly of the ratio of the area of the covered surface to the area of the total immersed surface, the portion of the specimen within $\frac{1}{2}$ inch of the cut end or edges being disregarded.

(h) The immersion, washing, and wiping operation just described is to be repeated successively, using the same portion of the standard solution of copper sulphate, until a bright, firmly adhering deposit of metallic copper remains on the specimen. The specimen is to be subjected to at least one more than the minimum number of such operations required for acceptable performance.

(i) A fixed deposit of metallic copper generally occurs first at the thinnest points in the zinc coating or at those points in the zinc coating where the zinc adheres to the steel less firmly than in others. The area occupied by the fixed deposit increases upon successive dips until the entire zinc coating has disappeared. After the dips have been completed on any one specimen, the portion of the solution of copper sulphate used is to be discarded. A fresh portion of the standard solution is to be employed for each of any succeeding specimens.

(j) The results are to be expressed as an estimate of the percentage of the total immersed surface (excepting the area of the 1/2-inch portion at the cut end or edges) which shows a fixed deposit of copper after each dip, i.e., after the specimen has been dipped, washed, rubbed, dried and then examined. Failure is to be recorded for any part from which a specimen shows a fixed deposit of copper as the result of a number of dips equal to or less than the required number stated in Section 12-7-208 (a).

Cadmium Coatings Sec. 12-7-209.

(a) The thickness of a cadmium coating on the steel parts shall not be less than 0.00050 inch.

(b) The method of determining the thickness of cadmium coatings is the chromic-acid dropping test, conducted as described in the following paragraphs.

(c) The solution to be used for the chromic-acid dropping test is to be made from distilled water and is to contain 200 grams per liter of chemically pure chromic acid, CrO₃; and 50 grams per liter of chemically pure concentrated sulfuric acid, H₂SO₄. (The latter is equivalent to 27 milliliters per liter of chemically pure concentrated sulfuric acid, specific gravity 1.84, containing 96 percent of H₂SO₄.)

(d) The test solution is to be contained in a glass vessel such as a separatory funnel with the outlet equipped with a stopcock and a capillary tube of approximately 0.025-inch inside bore and 5.5 inches long. The lower end of the capillary tube is tapered to form a tip, the drops from which are about 0.05 milliliter each. To preserve an effectively constant level, a small glass tube is inserted in the top of the funnel through a rubber stopper and its position is to be adjusted so that, when the stopcock is open, the rate of dropping is 100 ∇ 5 drops per minute. If desired, an additional stopcock may be used in place of the glass tube to control the rate of dropping.

(e) The sample and the test solution should be kept in the test room long enough to acquire the temperature of the room, which should be noted and recorded. The test is to be conducted at a room temperature between 64 and 95 \diamond F.

(f) Each sample is to be thoroughly cleaned before testing. All grease and other nonmetallic coatings are to be removed completely by means of suitable solvents. Samples are then to be thoroughly rinsed in water and dried with clean cheesecloth. Care should be exercised to avoid contact of the cleaned surface with the hands or any foreign material.

(g) The sample to be tested is to be supported from 0.7 to 1 inch below the orifice, so that the drops of solution strike the point to be tested and run off quickly. The surface to be tested should be inclined about 45 degrees from horizontal.

(h) After cleaning, the sample to be tested is to be put in place under the orifice. The stopcock is to be opened and the time in seconds is to be measured with a stop watch until the dropping solution dissolves off the protective metallic coating, exposing the base

metal. The end point is the first appearance of the base metal recognizable by the change in color at that point.

(i) Each sample of a test lot is to be subjected to the test at three or more points, excluding cut edges and threaded surfaces.

If the time required for dissolving off the cadmium coating in the test is not less than that given in Table 12-7-2B, corresponding to the room temperature, the thickness of the coating is considered to comply with the requirement of Section 12-7-209 (a).

Fire Endurance Tests Sec. 12-7-210.

(a) **Test Assemblies.** The construction, materials, and size of the test fire damper assembly, consisting of single dampers or single dampers installed in a multiple assembly, shall be representative of that for which the damper assembly is to be classified or rated. The size and dimensions of the test specimen and the exposure specified herein are intended to apply for rating of fire damper assemblies within the usual range employed in buildings. The testing agency may, at its discretion, require changes in the proposed installation when, in its judgment, such changes are necessary to obtain representative information on the performance of the construction under test, or when the proposed installation is not representative of those applied in building construction.

(b) **Test Installation Fire Dampers in Ducts, Partitions or Walls.** Each test fire damper assembly shall be installed on a Vertical Large-scale Wall Furnace as specified in SFM 12-7-3, Section 12-7-301 (a) in its intended position. If the conditions of use limit the fire damper assembly to smaller dimensions, a proportionate reduction may be made in the dimensions of the fire damper test specimen for a test qualifying them for such restricted use. Such test fire damper assembly shall be installed on a Vertical Half Scale (or larger) Furnace, as specified in SFM 12-7-3, Section 12-7-301 (b) in its intended position.

Fire dampers intended for use in ducts shall be installed in a sleeve. Fire dampers intended for installation in partitions or walls outside of ducts shall be installed in a frame. For a single fire damper, a sample damper shall be installed with the upstream side facing the furnace. An additional sample shall be installed with the downstream side facing the furnace. If multiple assemblies are tested at one time, the upstream sides or half the individual dampers and the downstream side of the other half of the dampers shall face the furnace. Dampers shall be installed so that there is not less than 6 inches of clearance between the perimeter of the damper and (1) the outer edge of the test panel, and (2) the perimeter of the second sample damper.

1. **Wall clearances.** Clearances between the fire damper assembly in their sleeves and the masonry opening shall be such that the lap of the mounting angles on the masonry is not less than 1 inch. The installation of the test fire damper assembly shall otherwise be made in accordance with the manufacturer's installation instructions.

2. **Masonry settings.** Masonry settings shall be allowed to season at least three days before fire test. Concrete settings shall be allowed to season at least 28 days before fire test.

(c) **Test Installation, Fire Dampers in Fire-resisting Ceilings.** Test specimen fire dampers shall be installed in a fire-resisting ceiling floor assembly on a Horizontal Large-scale Floor Furnace as specified in SFM 12-7-3, Section 12-7-301 (c). The area of the ceiling exposed to fire shall be not less than 180 square feet, with neither dimension less than 12 feet. Fire exposure shall be to the underside of the construction.

1. The ceiling-floor assembly shall be representative of the type of construction (combustible, noncombustible) and the fire endurance time period for which classification is desired, as to materials, workmanship and details such as dimensions of parts, and shall be representative of those obtaining as practically applied in building construction and operation.
 2. The number and area of individual fire dampers installed in each 100 square feet of ceiling area shall be representative of that for which the damper assembly is to be classified or rated.
 3. Test specimen fire dampers in fire-resisting ceilings shall be mounted in the bottom of the air duct section over the air outlet, or in the throat of the air duct outlet drop with support from the construction above. Subject to the provisions of Section 12-7-210 (a), the installation shall be made in accordance with the manufacturer's proposed installation instructions. Insulation around the duct, if any, or insulation around the air outlet duct drop shall be in accordance with the fire damper manufacturer's instructions.
 4. **Thermocouples.** The thermocouples, their placement and temperature readings shall conform to SFM 12-7-1, Section 12-7-102 (a), "Fire Tests of Building Construction and Materials." Thermocouples shall be placed on structural elements (beams, girders, joists and trusses) as specified in SFM 12-7-1, Section 12-7-110 (c).
- (d) Alternate Test Installation, Fire Dampers in Fire-resisting Ceilings.** Test specimen fire dampers shall be installed in a fire-resisting ceiling assembly on a Horizontal Small-scale Furnace as specified in SFM 12-7-3, Section 12-7-301 (d), in its intended position. The net ceiling area exposed to fire shall be not less than 40 square feet, with no dimension less than 5 feet.
1. Except for openings, the ceiling-floor or ceiling-roof assembly shall be representative of a ceiling-floor or ceiling-roof assembly which has been tested in the Horizontal Large-scale Floor Furnace, SFM 12-7-3, Section 12-7-301 (c), and for which a detailed test report containing temperature readings on the unexposed surface and structural framing members has been issued.
 2. The area of the fire damper shall be the maximum area for which the fire damper is to be classified.
 3. The test specimen fire damper shall be installed in a representative ceiling-floor or ceiling-roof assembly as indicated in Item 1. The minimum width of exposed ceiling area on two sides of the test specimen shall be not less than 12 inches with a minimum width of exposed ceiling area on the opposite side of not less than 6 inches. The test specimen fire damper shall be mounted in the bottom of a representative duct system over the air outlet, or in the throat of the air duct outlet drop with support from the constructions above. Subject to the provisions of Section 12-7-210 (a), the installation shall be made in accordance with the manufacturer's instructions. Insulation around the duct, if any, or insulation around the air outlet duct drop shall be in accordance with the fire damper manufacturer's proposed installation instructions.
 4. Temperature readings shall be taken on the unexposed surface, in the plenum space, on the underside of the floor or roof deck, and on three or more structural members when structural members are contained in the construction. Thermocouples, their placement and temperature readings shall conform to SFM 12-7-1, "Fire Tests of Building Construction and Materials," Sections 12-7-102 and 12-7-110 (c).

(e) The fire test shall be continued until the exposure period for which the damper assembly is to be rated is reached, or until the assembly fails to conform with the conditions of acceptance set forth in Sections 12-7-212 (a), (b), (c) or (d). The exposure period for which the assembly is to be rated shall be determined by test as being either 45 minutes, 1 hour, 1 1/2 hours, 2 hours or 3 hours.

Hose Stream Test Sec. 12-7-211.

(a) **Application.** Immediately following the fire exposure portion of the test, when required by the conditions of acceptance, the test assembly shall be subjected to the impact, erosion and cooling effects of a hose stream directed first at the middle and then at all parts of the exposed surface of the damper assembly, changes in direction being made slowly.

(b) **Time.** The hose stream shall be delivered through a 2 1/2-inch hose discharging through a national standard playpipe of corresponding size equipped with a 1 1/8-inch discharge tip of the standard-taper smooth-bore pattern without shoulder at the orifice. The water pressure at the base of the nozzle and duration of application in minutes per 100 square feet of exposed area of the damper assembly shall be as given in Table 12-7-2C.

(c) **Distance.** The tip of the nozzle shall be located 20 feet from and on a line normal to the center of the test assembly. If impossible to be so located, the nozzle may be on a line deviating not more than 30 degrees from the line normal to the center of the assembly. When so located, the distance from the center shall be less than 20 feet by an amount equal to 1 foot for each 10 degrees of deviation from the normal.

Conditions of Acceptance Sec. 12-7-212.

(a) Fire Dampers in Duct Systems Passing through Partitions or Walls.

1. A damper assembly shall remain in the opening during the fire endurance test for the fire exposure period for which it is to be rated and for the hose stream test.
2. All dampers in the test assembly shall close and latch automatically (if a latch is provided) during the first 60 seconds of the fire endurance portion of the test or before the furnace temperature at the fusible element location reaches 285°F (141°C), whichever occurs first. The temperature on the standard time-temperature curve at one minute is 285°F (141°C).
3. During the fire and hose stream test, the movement or warping of any part of the damper assembly shall not result in a visible through opening when viewed on a plane perpendicular to the mounting plane.
4. During the fire endurance and hose stream test, movement or warping of any part of the damper assembly shall not result in through openings between individual parts greater than 3/4 inch during the fire endurance portion of the test, and greater than 1 inch during the hose stream portion of the test.
5. Vertical through openings at the sides of multiblade dampers provided for operating clearances shall not increase in width during the fire endurance and hose stream test.
6. Latching mechanisms, blade shafts in their bearings, interlockingtype damper blades with relation to their guides, and blade guides shall remain engaged and secure during the fire exposure and hose stream test.

(b) Fire Dampers in Door, Partitions or Walls outside of Ducts.

1. A damper assembly shall remain in the opening during the fire endurance test for the fire exposure period for which it is to be rated and for the hose stream test.

2. All dampers in the test assembly shall close and latch automatically (if a latch is provided) during the first 60 seconds of the fire endurance portion of the test or before the furnace temperature at the fusible element location reaches 285°F (141°C), whichever occurs first. The temperature on the standard time-temperature curve at one minute is 285°F (141°C). 3. During the fire and hose stream test, the movement or warping of any part of the damper assembly shall not result in a visible through opening when viewed on a plane perpendicular to the mounting plane.

4. During the fire endurance test, movement or warping of any part of the damper assembly shall not result in visible through openings between individual parts, at the sides, or around the blades as viewed in any direction.

5. During the hose stream test, the movement or warping of any part of the damper assembly shall not result in through openings between individual parts as viewed in any direction greater than one-half the width of blade lap on each other or on blade stops, but shall in no case exceed 1/2 inch.

6. Latching mechanisms, blade shafts in their bearings, interlockingtype damper blades with relation to their guides, and blade guides shall remain engaged and secure during the fire exposure and hose stream test.

(c) Fire Dampers in Fire-resisting Ceilings. The ceiling-floor assembly tested in the Horizontal Large-scale Furnace as set forth in SFM 12-7-3, Section 12-7-301 (c), may be rated for fire endurance in accordance with conditions of acceptance set forth in SFM 12-7-1, Section 12-7-110 (d).

(d) Fire Dampers in Fire-resisting Ceilings, Alternate Test Method. Classification of fire damper assemblies for use in fire- resisting ceilings tested in the Horizontal Small-scale Furnace as set forth in SFM 12-7-3, Section 12-7-301 (d), shall be in accordance with the following:

1. The fire damper assembly, or assemblies, in its frame shall remain in the ceiling opening during the fire endurance test for the fire exposure period for which it is to be rated. Openings in the ceiling assembly shall not result in greater distortion or warping of components, or larger through openings than in the ceiling-floor assembly tested without openings.

2. Transmission of heat through the ceiling-floor assembly during the fire endurance test shall not have been such as to raise the average temperature on its unexposed surface more than 250°F above its initial temperature or more than 325°F at any point.

3. The average temperature of three thermocouples on the bottom surface of combustible framing members in one hour fire endurance rated assemblies shall not exceed 600°F before 30 minutes, or a temperature of 1200°F before 55 minutes. (Criteria based on 2 inches by 10 inches construction grade Douglas fir wood joists spaced 16 inches on center.)

4. The average temperature in any section of solid section structural steel shall not exceed 1000°F and the maximum temperature at any point shall not exceed 1200°F.

5. The average temperature in any section of steel joists (top chord, diagonal web member and bottom chord) shall not exceed 800°F and the maximum temperature at any point shall not exceed 1000°F.

Marking Sec. 12-7-213.

(a) **Label.** Fire damper assemblies shall bear a label issued by an approved listing agency or a label approved by the State Fire Marshal showing the fire-protection rating of the assembly.

(b) **Label Markings.** The markings on the labels approved by the State Fire Marshal shall include the following:

1. Name and address of the listee.
2. Model number or type.
3. Symbol, serial or issue number issued by the listing agency, or file number assigned by the State Fire Marshal.
4. Rating of 3, 1 1/3, 1 or 3/4 hour indicating duration of exposure to fire.
5. The words "Duct," "Wall" or "Ceiling" following the hourly rating designating the location for which the assembly is designed.

TABLE 12-7-2A-TEST FOR FIRE DAMPERS

	<u>FIRE DAMPERS IN OR OUTSIDE OF DUCTS THROUGH WALLS OR PARTITIONS</u>		<u>FIRE DAMPERS IN OPENINGS THROUGH FIRE-RESISTING CEILINGS</u>	
	<u>Gravity operated</u>	<u>Spring operated</u>	<u>Gravity operated</u>	<u>Spring operated</u>
(1) <u>Closing Reliability</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
(2) <u>Dust Loading</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
(3) <u>Salt-Spray Exposure</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
(4) <u>Spring Closing Force</u>	-	<u>X</u>	-	<u>X</u>
(5) <u>Fire Endurance</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
(6) <u>Hose Stream</u>	<u>X</u>	<u>X</u>	-	-

x = Test applicable

- = Test not applicable

TABLE 12-7-2B-CADMIUM COATING DISSOLVE TIME

<u>TEMPERATURE IN DEGREES FAHRENHEIT</u>	<u>TIME IN SECONDS</u>
<u>65</u>	<u>12</u>
<u>70</u>	<u>11</u>
<u>75</u>	<u>11</u>
<u>80</u>	<u>10</u>
<u>85</u>	<u>10</u>
<u>90</u>	<u>10</u>
<u>95</u>	<u>9</u>

TABLE 12-7-2C-HOSE STREAM TEST

	<u>WATER PRESSURE AT BASE OF NOZZLE, POUNDS PER SQUARE INCH</u>	<u>DURATION OF APPLICATION, MINUTES PER 100 SQUARE FEET EXPOSED AREA</u>
<u>3 hours</u>	<u>45</u>	<u>5</u>
<u>1 1/2 hours and over if less than 3 hours</u>	<u>30</u>	<u>2 1/2</u>
<u>1 hour and over if less than 1 1/2 hours</u>	<u>30</u>	<u>1 1/2</u>